

## External wiring

The schematic diagram illustrates the power module's internal components and connections. It features three channels (CH1, CH2, CH4) with current inputs ranging from -20mA to +20mA and voltage inputs ranging from -10V to +10V. The module includes a DC/DC converter, a +5V regulator, and a +15V regulator. It also shows a system grounding point and a power module connection point.

## WARNING

 Please carefully read this instruction thoroughly prior to use the DVP04AD-H.

 The DC input power must be OFF before any maintenance.

 This is an OPEN-TYPE built-in DVP04AD-H, and the DVP04AD-H is certified to meet the safety requirements of IEC 61131-2 (UL 508) when installed in the enclosure to prevent high temperature, high humidity, excessive vibration, corrosive gases, liquids, airborne dust or metallic particles. Also, it is equipped with protective methods such as some special tool or key to open the enclosure, in order to prevent the hazard to users and the damage to the DVP04AD-H.

 Do not connect the AC power to any of the input/output terminals, or it may damage the DVP04AD-H. Make sure that all the wiring is well conducted prior to power on.

 Do not touch the internal circuit for at least 1 minute after the power OFF.

## 1 Model Explanation and Peripherals

- ### ■ Nameplate Explanation

**Serial Number**

Q4AD-H 0 I 4 12 0003

S: for SS series MPU  
P: for EP series MPU  
H: for EH series MPU

X4: A/D, D/A Functions  
PT: PTC temperature sensor module  
PC: High speed count input module  
PU: single axis positioning unit

The diagram consists of three views of the terminal block:

- Front View (Top):** Shows the terminal block with dimensions 82mm (height) and 66mm (width). Callout 1 points to the DIN rail track (35mm). Callout 2 points to the mounting hole for wire connection. Callout 3 points to the model name.
- Side View (Middle):** Shows the terminal block with dimensions 55mm (height) and 68mm (width). Callout 4 points to the mounting hole for wire connection. Callout 5 points to the indicator for power, error, and run status. Callout 6 points to the terminal block.
- Top View (Bottom):** Shows the terminal block with dimensions 82mm (height) and 66mm (width). Callout 7 points to the terminal block. Callout 8 points to the mounting hole for wire connection. Callout 9 points to the terminal block.

Unit: mm

## STANDARD SPECIFICATIONS

|                                  |                                                                                                                                                                                                                          |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Connect to DVP-PLC MPU in series | <p>If DVP04AD-H modules are connected to MPU, the modules are numbered from 0 ~ 7. 0 is the closest and 7 is the furthest to the MPU. 8 modules is the max and they do not occupy any digital I/O points of the MPU.</p> |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                     |                                                                      |
|-------------------------------------|----------------------------------------------------------------------|
| Power Specification                 |                                                                      |
| Max. Rated Consuming Power          | 24 VDC(20.4VDC~28.8VDC) ( -15%~+10%), 2W, supply from external power |
| Environment Condition               |                                                                      |
| Environment Condition               | Follow the DVP-PLC MPU                                               |
| Spec. of Prevent Static Electricity | All places between terminals and ground comply with the spec.        |

| DVP04ADH analog signal input module |                   |                                  |               | Explanation                                                                                                                                                                                                                                     |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
|-------------------------------------|-------------------|----------------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|----------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|-----------------------------------------------|--|--|--|--|--|--|--|
| CR No.                              | Parameter address | Latched                          | Register name |                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #0                                  | H 4000            | <input type="radio"/>            | R             | Reserved                                                                                                                                                                                                                                        |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #1                                  | H 4001            | <input type="radio"/>            | R/W           | Input mode setting: factory setting is H0000.<br>Mode 0: input voltage mode (-10V→+10V).<br>Mode 1: input voltage mode (-6V→+10V).<br>Mode 2: input current mode (-12mA→+20mA)<br>Mode 3: input current mode (-20mA→+20mA)<br>Mode 4: none use. |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #2                                  | H 4002            | <input type="radio"/>            | R/W           | CH1 average times                                                                                                                                                                                                                               |  |  |  | The number of readings used for calculating "average" temperature on channels CH1~CH4. Setting range is K1~K4096 and factory setting is K10. |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #3                                  | H 4003            | <input type="radio"/>            | R/W           | CH2 average times                                                                                                                                                                                                                               |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #4                                  | H 4004            | <input type="radio"/>            | R/W           | CH3 average times                                                                                                                                                                                                                               |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #5                                  | H 4005            | <input type="radio"/>            | R/W           | CH4 average times                                                                                                                                                                                                                               |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #6                                  | H 4006            | <input checked="" type="radio"/> | R             | average value of CH1 input signal                                                                                                                                                                                                               |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #7                                  | H 4007            | <input checked="" type="radio"/> | R             | average value of CH2 input signal                                                                                                                                                                                                               |  |  |  | Display average value of CH1~CH4 input signal                                                                                                |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #8                                  | H 4008            | <input checked="" type="radio"/> | R             | average value of CH3 input signal                                                                                                                                                                                                               |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #9                                  | H 4009            | <input checked="" type="radio"/> | R             | average value of CH4 input signal                                                                                                                                                                                                               |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #10 ~ #11                           |                   |                                  |               | Reserved                                                                                                                                                                                                                                        |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |                                               |  |  |  |  |  |  |  |
| #12                                 | H 400C            | <input checked="" type="radio"/> | R             |                                                                                                                                                                                                                                                 |  |  |  |                                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  | Display present value of CH1~CH2 input signal |  |  |  |  |  |  |  |

**Explanation:**

1. CR#0: The content of CR#0 is model type, user can read the data from program to know if there is extension module.

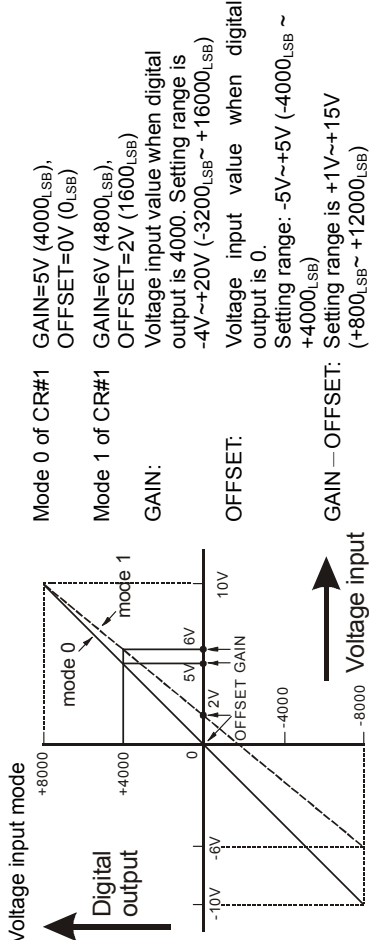
9. CR#30 is the fault code. Please refer to the chart below.

Note: Each fault code will have corresponding bit (b0~b7). Two the same time. 0 means normal and 1 means having fault.

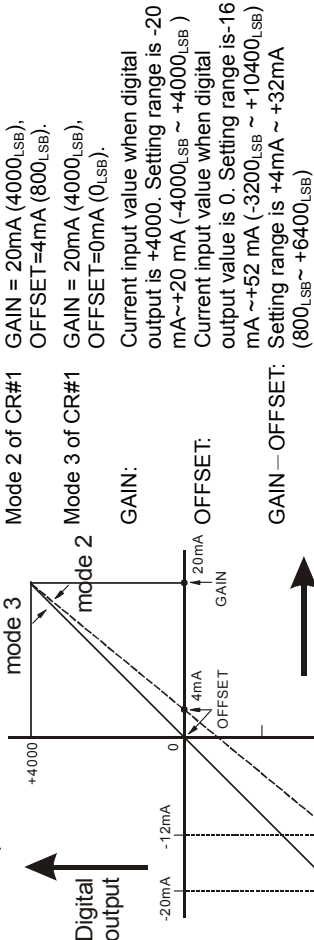
10. CR#31: it is used to set RS-485 communication address. Setting range is 01~255 and factory setting is K1.
11. CR#32 is used to set RS-485 communication baud rate: 4800, 9600, 19200, 38400, 57600, 115200 bps. b0: 4800bps. (factory setting) b2: 19200bps. b3: 38400 bps. b4: 57600 bps. b5: 115200 bps. b6-b13: reserved. b14: exchange low and high byte of CRC check code. (only for RTU mode) b15=0: ASCII mode. b15=1: RTU mode. Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1).
12. CR#33 is used to set the internal function priority, such as characteristic register. Output latched function will save output setting in the inner memory before power loss.
13. CR#34: software version.
14. CR#35~ CR#48: system used.
15. The corresponding parameters address H4000~H4030 of CR#0~CR#48 are provided for user to read/write data through RS-485.
- A. Communication baud rate: 4800, 9600, 19200, 38400, 57600, 115200 bps.
- B. Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1).
- C. Function code: 03H—read data from register. 06H—write one WORD into register. 10H—write multiple WORD into registers.

## 5 ADJUST A/D CONVERSION CHARACTERISTIC CURVE

### 5.1 Adjust A/D Conversion Characteristic Curve



Current input mode:

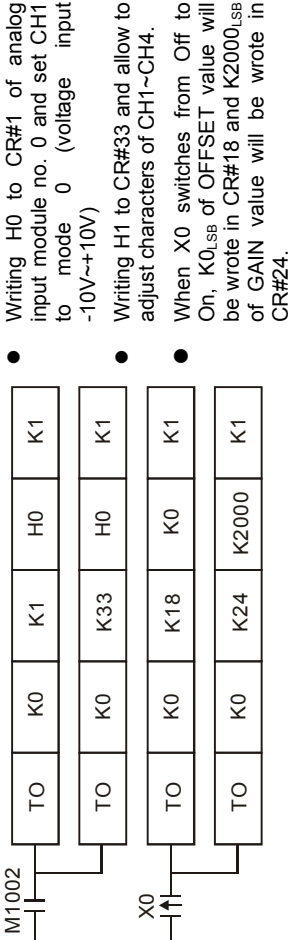


Using charts above to adjust A/D conversion characteristic curve of voltage input mode and current input mode. Users can adjust conversion characteristic curve by changing OFFSET values (CR#18~CR#21) and GAIN values (CR#24~CR#27) depend on application.

LSB(Least Significant Bit): 1. voltage input: 1<sub>LSB</sub>=10V/8000=1.25mV. 2. current input: 1<sub>LSB</sub>=20mA/4000=5μA.

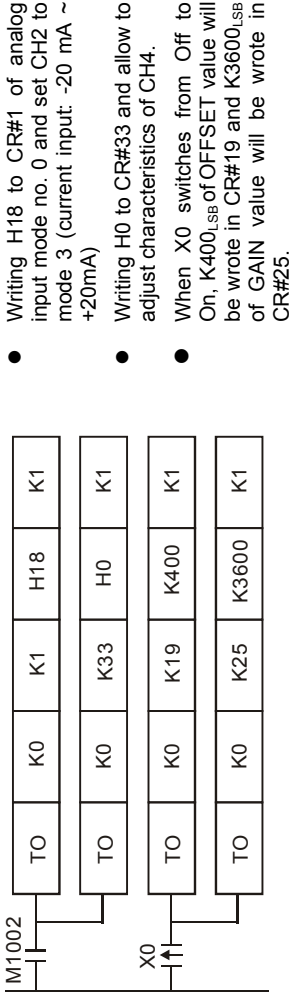
### 5.2. Program Example for Adjusting A/D Conversion Characteristics Curve

Example 1: setting OFFSET value of CH1 to 0V(=K0<sub>LSB</sub>) and GAIN value of CH1 to 2.5V(=K2000<sub>LSB</sub>).



Example 2: setting OFFSET value of CH2 to 2mA(=K400<sub>LSB</sub>) and GAIN value of CH2 to 18 mA

(=K3600<sub>LSB</sub>)



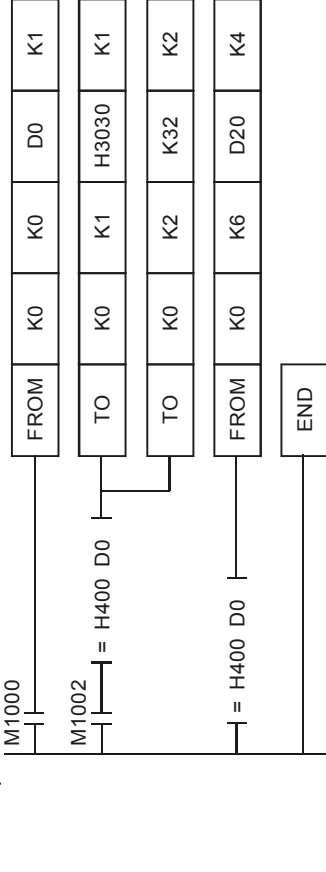
- Writing H18 to CR#1 of analog input mode no. 0 and set CH2 to mode 3 (current input: -20 mA ~ +20mA)
- Writing H0 to CR#33 and allow to adjust characteristics of CH4.
- When X0 switches from Off to On, K400<sub>LSB</sub> of OFFSET value will be wrote in CR#19 and K3600<sub>LSB</sub> of GAIN value will be wrote in CR#25.

## 6 INITIAL PLC START-UP

### Lamp display:

- When power is on, POWER LED will be lit and ERROR LED will be lit for 0.5 second.
- Normal run: POWER LED should be lit and ERROR LED should turn off. When power supply is lower than 19.5V, ERROR LED will blink continuously till the power supply goes higher than 19.5V.
- When it connects to PLC MPU in series, RUN LED on MPU will be lit and A/D LED or D/A LED should blink.
- After receiving the first RS-485 instruction during controlling by RS-485, A/D LED or D/A LED should blink.
- After converting, ERROR LED should blink if input or output exceeds upper bound or lower than lower bound.

### Example:



### Explanation:

- Read the data of model type from extension module K0 and distinguish if the data is H400 (DVP04AD-H model type).
- If the model type is DVP04AD-H, M11 is on and the setting input mode is (CH1, CH3)= mode 0, (CH2, CH4)= mode 3.
- Set the number of times for average of CH1 and CH2 are K32.
- Read the input signal average value of CH1~CH4 (4 data) and saved into D20~D23.

## 7 RELATED INSTRUCTIONS EXPLANATION

| API                                                                                                                                                                                                                                                                                                                                                        | D | FROM       |   |             | (M1) | (M2) | (D) | (n) | Read special module CR data | Applicable model |    |    |   |                              |   |      |                               |                 |       |                      |                 |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------------|---|-------------|------|------|-----|-----|-----------------------------|------------------|----|----|---|------------------------------|---|------|-------------------------------|-----------------|-------|----------------------|-----------------|--|
|                                                                                                                                                                                                                                                                                                                                                            |   |            |   | P           |      |      |     |     |                             | ES               | EP | EH | ✓ |                              |   |      |                               |                 |       |                      |                 |  |
| 78                                                                                                                                                                                                                                                                                                                                                         |   |            |   |             |      |      |     |     |                             | ✓                |    | ✓  |   |                              |   |      |                               |                 |       |                      |                 |  |
|                                                                                                                                                                                                                                                                                                                                                            |   | Bit device |   | Word device |      |      |     |     |                             |                  |    |    |   | 16-bit instruction (9 STEPS) |   |      | 32-bit instruction (17 STEPS) |                 |       |                      |                 |  |
|                                                                                                                                                                                                                                                                                                                                                            | X | Y          | M | S           | K    | H    | KnX | KnY | KnM                         | KnS              | T  | C  | D | E                            | F | FROM | Continuous execution          | Pulse execution | DFROM | Continuous execution | Pulse execution |  |
| m <sub>1</sub>                                                                                                                                                                                                                                                                                                                                             |   |            |   |             |      | *    | *   | *   | *                           | *                | *  | *  | * | *                            | * |      |                               |                 |       |                      |                 |  |
| m <sub>2</sub>                                                                                                                                                                                                                                                                                                                                             |   |            |   |             |      | *    | *   | *   | *                           | *                | *  | *  | * | *                            | * |      |                               |                 |       |                      |                 |  |
| D                                                                                                                                                                                                                                                                                                                                                          |   |            |   |             |      |      |     | *   | *                           | *                | *  | *  | * | *                            | * |      |                               |                 |       |                      |                 |  |
| n                                                                                                                                                                                                                                                                                                                                                          |   |            |   |             |      | *    | *   | *   | *                           | *                | *  | *  | * | *                            | * |      |                               |                 |       |                      |                 |  |
| <ul style="list-style-type: none"><li>Note: The usage range of operand m<sub>1</sub> is 0~7.<br/>The usage range of operand m<sub>2</sub>: ES/EP: 0~48, EH: 0-254.<br/>The usage range of operand n: ES/EP: n= 1~(49-m<sub>2</sub>), EH: 1~(255-m<sub>2</sub>).<br/>ES series model doesn't support pulse execution instruction (FROMP, DFROMP).</li></ul> |   |            |   |             |      |      |     |     |                             |                  |    |    |   |                              |   |      |                               |                 |       |                      |                 |  |
| <ul style="list-style-type: none"><li>Flag: When M1083-On, it allows to insert interrupt during FROM/TO<br/>Refer to following for detail.</li></ul>                                                                                                                                                                                                       |   |            |   |             |      |      |     |     |                             |                  |    |    |   |                              |   |      |                               |                 |       |                      |                 |  |

- (M1): the number for special module. (M2): the number of CR (Control Register) of special module that will be read. (D): the location to save reading data. (n): the data number of reading one time.
- DVP-series PLC uses this instruction to read CR data of special module.
- (D): When assigning bit operand, K1~K4 are used for 16-bit and K5~K8 are used for 32-bit.
- Please refer the footnote below for the calculation of special module number.
- To read the content of CR#24 of special module#0 to D0 of PLC and to read the content of CR#25 of special module#0 to D1 of PLC. It can read 2 data in one time (n=2).

- The instruction will be executed when X0=On. The instruction won't be executed when X0=Off and the content of previous reading data won't change.



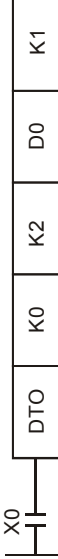
| API                                                                                                                                                                                                                                                                                                        | TO |             | P |   | (m1) | (m2) | (S) | (n) | Special module CR data write in |     | Applicable model |    |    |   |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------|---|---|------|------|-----|-----|---------------------------------|-----|------------------|----|----|---|---|
| 79                                                                                                                                                                                                                                                                                                         | D  |             |   |   |      |      |     |     |                                 |     | ES               | EP | EH | ✓ |   |
|                                                                                                                                                                                                                                                                                                            |    |             |   |   |      |      |     |     |                                 |     |                  |    |    |   |   |
|                                                                                                                                                                                                                                                                                                            |    | Word device |   |   |      |      |     |     |                                 |     |                  |    |    |   |   |
|                                                                                                                                                                                                                                                                                                            | X  | Y           | M | S | K    | H    | KnX | KnY | KnM                             | KnS | T                | C  | D  | E | F |
| m1                                                                                                                                                                                                                                                                                                         |    |             |   |   | *    | *    | *   | *   | *                               | *   | *                | *  | *  | * | * |
| m2                                                                                                                                                                                                                                                                                                         |    |             |   |   | *    | *    | *   | *   | *                               | *   | *                | *  | *  | * | * |
| S                                                                                                                                                                                                                                                                                                          |    |             |   |   | *    | *    | *   | *   | *                               | *   | *                | *  | *  | * | * |
| n                                                                                                                                                                                                                                                                                                          |    |             |   |   | *    | *    | *   | *   | *                               | *   | *                | *  | *  | * | * |
| <ul style="list-style-type: none"><li>Note: The usage range of operand m1 is 0~7.<br/>The usage range of operand m2: ES/EP: 0~48, EH: 0~254.<br/>The usage range of operand n: ES/EP: n=1~(49-m2), EH: 1~(255-m2).<br/>For ES series, it doesn't support pulse execution instruction (TOP, DTOP)</li></ul> |    |             |   |   |      |      |     |     |                                 |     |                  |    |    |   |   |
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Command Explanation

Program Example

Footnote

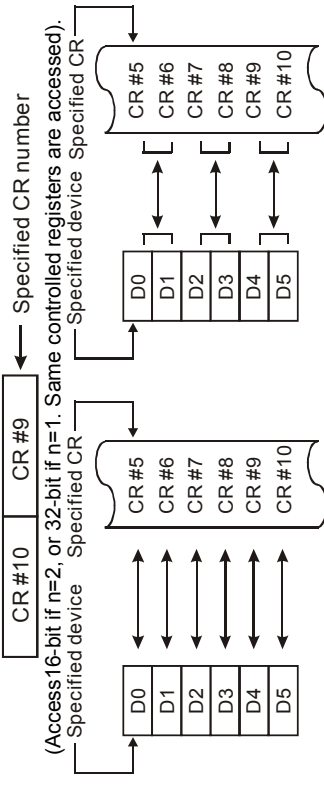
- (M1): the number of special module. (M2): the number of CR (Control Register) of special module that will be wrote in. (S): the data to write in CR. (n): the data number to write in one time.
- DVP-series PLC uses this instruction to write data into CR of special module.
- (S): When assigning bit operand, K1~K4 can be used for 16-bit and K5~K8 can be used for 32-bit.
- Using 32-bit instruction DTOP, program will write D11 and D10 into CR#3 and CR#2 of special module#0. It only writes a group of data in one time (n=1).
- The instruction will be executed when X0=On and it won't be executed when X0=Off. The data that wrote in previous won't have any change.



### The rule of instruction operand:

- m1: arrangement number of special module. The number of special module that connects to PLC MPU. The numbering order of special module from the near to the distant of MPU is from 0 to 7. The maximum is 8 special modules and won't occupy I/O point.
- m2: the number of CR. Built in 16-bit of 49 groups memory of special module is called CR (Control Register). The number of CR uses decimal digital (#0~#48). All running status and setting values of special module has included.
- If using FROM/TO instruction, the unit of read/write of CR is one number for one time. If using DFROM/DTOP instruction, the unit of read/write of CR is two numbers in one time.

Upper 16-bit Lower 16-bit



- In ES series models, flag M1083 is not provided. When FROM/TO instruction is executed, all interrupts (including external or internal interrupt subroutines) will be disabled. All interrupts will be executed after completing FROM/TO instruction. Besides, FROM/TO instruction also can be executed in the interrupt subroutine.
- The function of the flag M1083 (FROM/TO mode exchange) provided in EI/EH series models:
  - When M1083=Off, all interrupts (including external or internal interrupt subroutines) will be disabled when FROM/TO instruction is executed. The interrupts will be resumed after FROM/TO instruction complete. Please be advised FROM/TO instruction can be executed in the interrupt subroutine.
  - When M1083=On, if an interrupt enable occurs while FROM/TO instruction is executing, the interrupt FROM/TO instruction will be blocked till the requested interrupt finish. Unlike M1080 off situation, FROM/TO instruction cannot be executed in the interrupt subroutine.